

NAME:	SCIENCE TEACHER:	10C
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SCIENCE

Year 10 Examination 2010

10 C – 40 marks

Make sure that you have answered all the questions in Paper 10B before you start this paper

Time allowed for both examinations: 2 hours

Answer all questions in the spaces provided on the paper.

You may use a calculator.

Show all your working in calculations; marks are awarded for it.

Give units for all answers (e.g. kg or m) unless they are already provided.

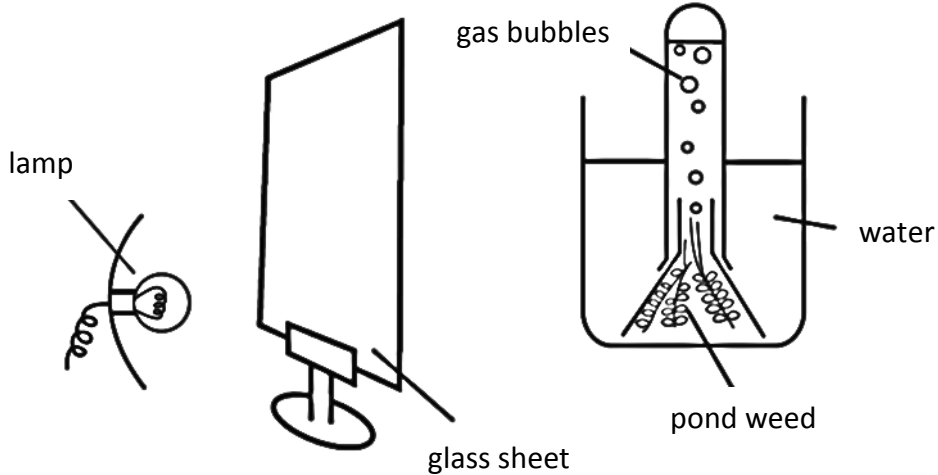
For Teacher Use

<i>Question</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>Total</i>
<i>Marks gained</i>								
<i>Marks available</i>	6	6	6	5	8	5	4	40

ANSWER ALL THE QUESTIONS IN THE SPACES PROVIDED

Question One: Plants [6 marks]

The investigation below was set up to show the effect of light intensity on the rate of photosynthesis in pond weed. The rate was measured by counting the number of gas bubbles released per minute.



- (a) If the glass sheet was removed what factor, other than light intensity, might affect the rate of photosynthesis?

- (b) Suggest a way in which the light intensity could be altered.

Six groups of pupils carried out the investigation. The averages of their results are shown in the table.

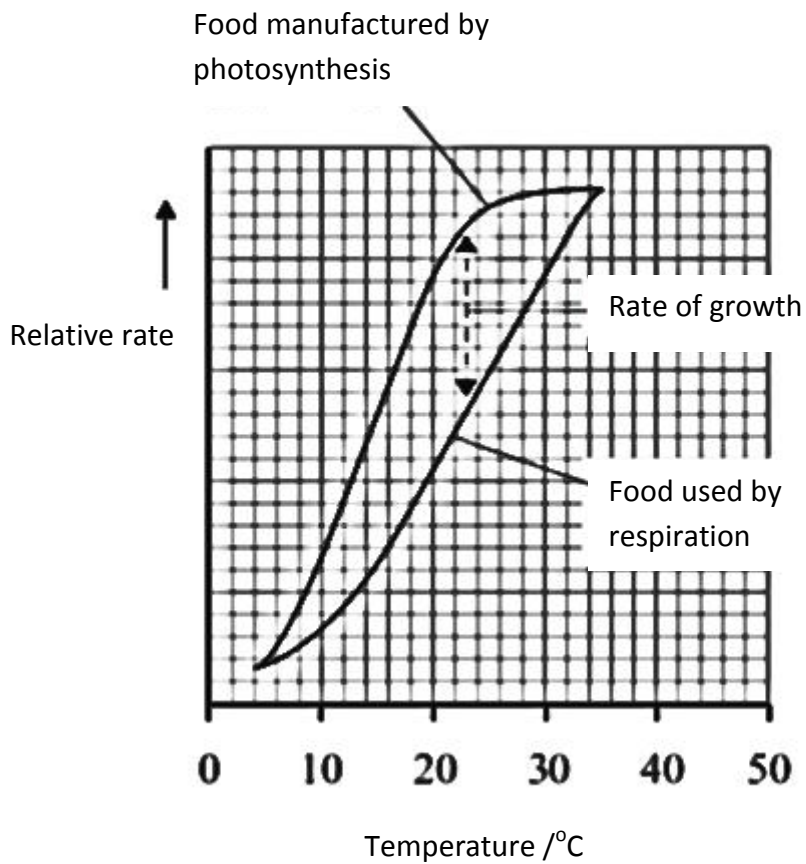
Light intensity (units)	2	4	6	8	10	12	14
Average rate of photosynthesis (bubbles/minute)	4	9	12	20	22	24	24

- (c) From the results, describe the effect of increasing light intensity on the rate of photosynthesis.

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(d) What is the advantage of having six groups carry out the investigation?

The graph below shows the effect of temperature on the rate of photosynthesis and respiration in a plant.

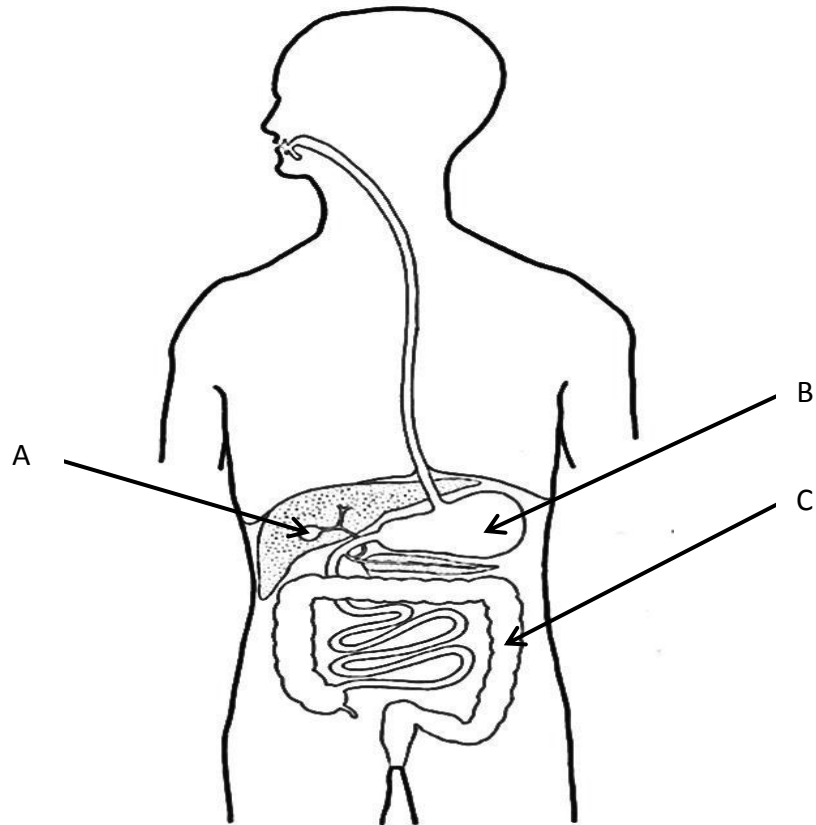


(e) Explain the difference between the words photosynthesis and respiration.

(f) Use the graph to suggest why it is better to grow plants at 25°C than 15°C.

Question Two: Digestion [6 marks]

An outline of the human digestive system is shown.

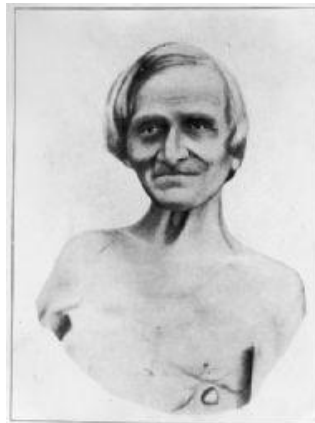


- (a) Identify the **names** of the organs labelled A, B and C. Describe the **role** that each of the identified organs plays in digestion.

ORGAN	NAME	ROLE (WHAT IT DOES)
A		
B		

C		
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On June 6, 1822 Alex St. Martin was working at a fur-trading post in America when he was accidentally shot with a musket at close range. The charge of the musket-shot blew a fist-sized hole into his stomach.



William Beaumont, a US Army surgeon, treated the wound. When the wound healed itself, the edge of the Alex's stomach had attached itself to the skin, creating a permanent hole. Beaumont recognized the opportunity he had in Alex - he could literally watch the processes of digestion by dangling food on a string into Alex's stomach, and then later pull it out to observe to what extent the food had been digested.

(b) The liquid from Alex's stomach broke down meat. What is the main food type found in meat?

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(c) Circle the solution that Beaumont would need to choose to carry out this food test

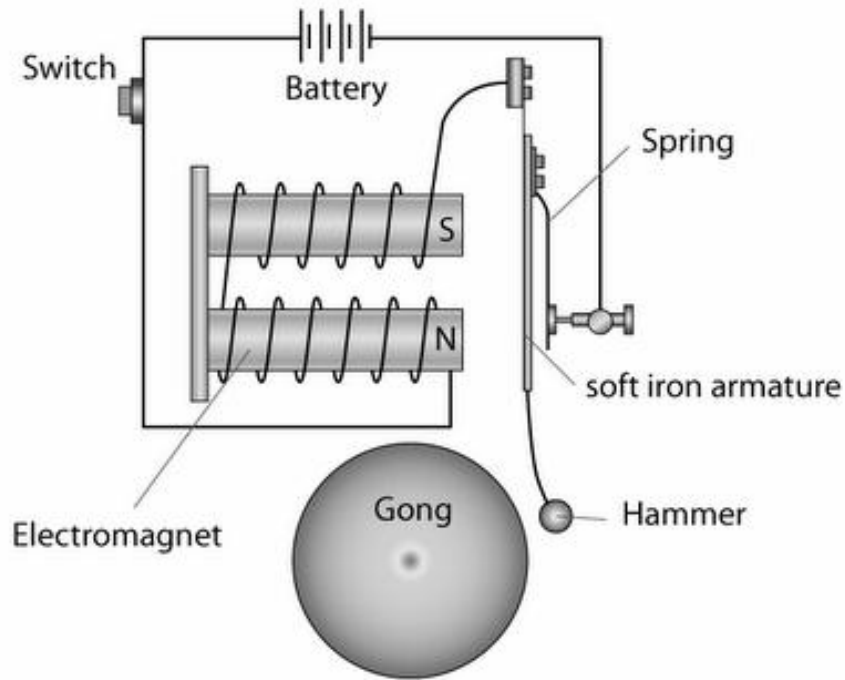
Iodine solution / Biuret Solution / Benedict's Solution

(d) Describe the method Beaumont would follow to do this food test

(e) What result would Beaumont have seen if the meat had been digested?

Question Three: Electricity [6 marks]

This diagram is taken from a science text book. It shows a circuit diagram for an electric bell similar to the bells used at Wanganui High School.

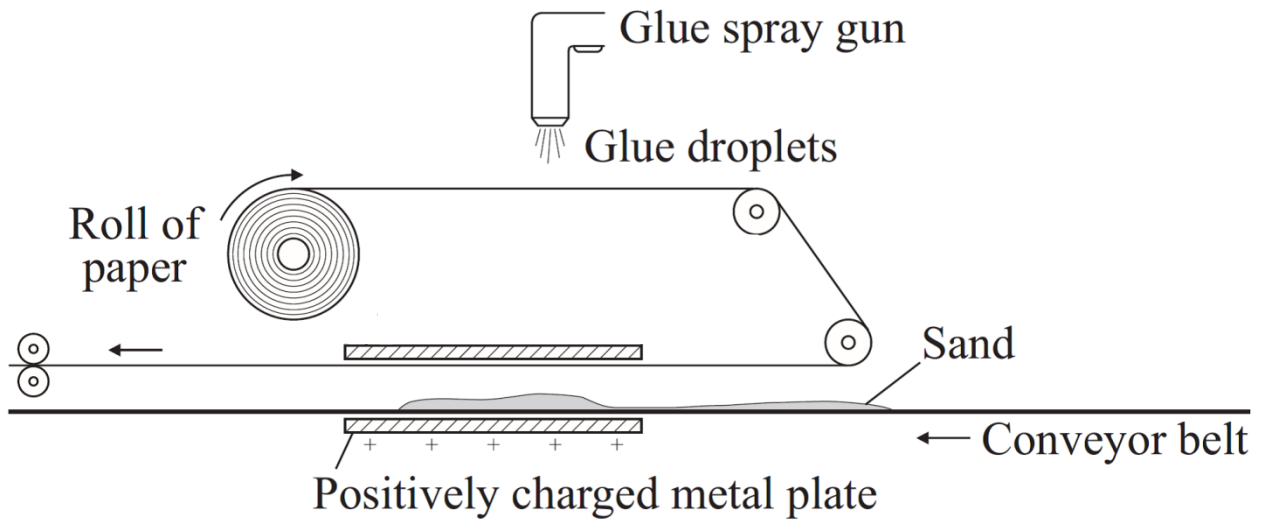


- (a) Name a suitable material for making the electromagnet. Give a reason for your answer

- (b) Write a paragraph to explain why pushing the switch makes the electric bell ring continually.

(c) Static electricity can be both useful and a nuisance.

The diagram shows a method of producing sandpaper using static electricity



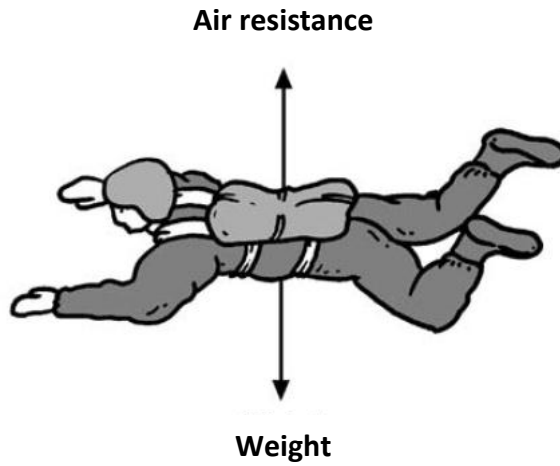
Glue is sprayed onto a moving strip of paper. As the glue leaves the spray gun, the glue breaks up into tiny negatively charged droplets which coat the paper. The sticky paper passes between two metal plates. Sand moving on a conveyor belt also passes between the metal plates.

(i) Explain the advantage of having all the droplets of glue negatively charged.

(ii) Explain why the sand moves towards the sticky paper.

Question Four: Down to Earth [5 marks]

The diagram shows a parachutist falling through the air, together with the forces acting on the parachutist. The parachutist speeds up and eventually reaches terminal velocity.



The parachutist weighs 500 N.

(a) Complete the sentences by choosing a phrase from the boxes below.

A. Less than 500 N	B. Equal to 500N	C. More than 500N
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Each phrase may be used once, more than once or not at all.

- (i) When the parachutist is speeding up the air resistance is _____
- (ii) When the parachutist is speeding up the weight is _____
- (iii) When the parachutist reaches terminal velocity the air resistance is _____

(b) After reaching terminal velocity but before reaching the ground, the parachutist opens the parachute.

(i) State what effect this has, if any, on the two forces acting on the parachutist.

(ii) State what effect this has on the motion of the parachutist.

Question Five: Earthquake [8 marks]

The Modified Mercalli intensity scale measures the actual effect an earthquake has on people, buildings, and the environment.

Modified Mercalli intensity scale

Magnitude	Effect
I	----- Only felt by a very few.
II	----- Felt by persons at rest.
III	----- Felt indoors. Some hanging objects swing.
IV	----- Vibration like heavy traffic passing, or like the jolt of a heavy object falling.
V	----- Generally felt outside. Most sleepers awakened. Small, unstable objects move, some glassware and crockery broken.
VI	----- Felt by all. Difficulty in walking steadily. Objects fall from shelves. Slight damage to badly constructed buildings.
VII	----- General alarm. Difficulty in standing. Some damage to buildings not designed to withstand earthquakes. Furniture moves. Unreinforced chimneys, roofing tiles and water tanks broken.
VIII	----- Alarm may approach panic. Steering of motorcars greatly affected. Some damage to earthquake-resistant buildings. Serious damage to less well-designed building types. Monuments and elevated tanks brought down.
IX	----- Heavy damage to buildings and bridges. Houses not secured to foundations shifted off. Landslides widespread on steep slopes. Cracking of ground conspicuous.
X	----- Severe damage to many buildings and bridges, even those of most recent design.

Below are some descriptions of earthquakes. Read each account and then decide their intensity according to the Modified Mercalli scale.

A: We thought it was a truck coming down the road, but when the lights started swaying gently we knew it was an earthquake.

B: My bedroom was covered with everything – books, toys, felts; the wardrobe door was off its hinges and my fish had come out of the bowl. There was water all over the floor from the fish bowl. We could hardly move in there. The room was a total mess.

C: The house wavered to and fro. Books, glass, and china on the shelves came crashing down, along with the chimney. I rushed to open the door, but it was some time before I could open it. I was thrown down. Our house, though somewhat out of perpendicular, was not down. The roof however was entirely dislodged. However, less well constructed houses had collapsed.

(a) Write down the magnitude you would give to each of the earthquakes.

A:	B:	C:
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Information

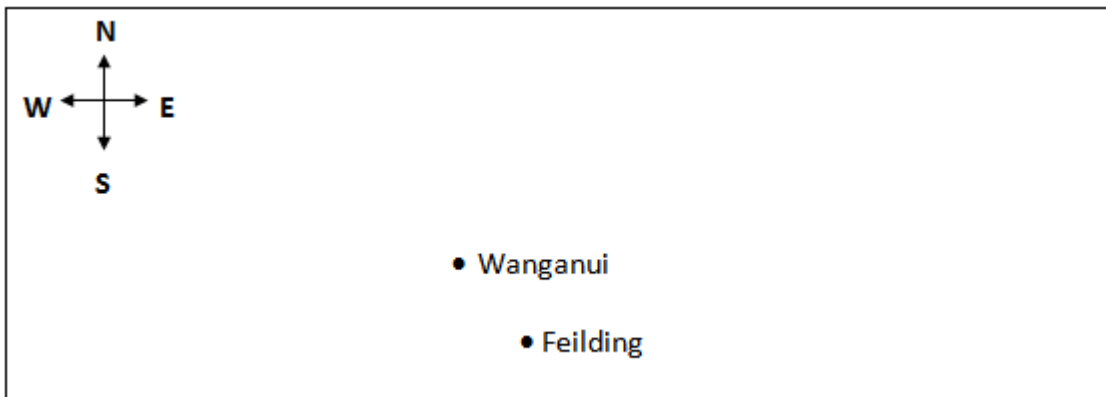
The **epicentre** of an earthquake can be located by measuring the time between the arrival of P and S waves from the earthquake epicentre. If you count the time in seconds between these two waves and then multiply this by 8 it will tell you how far away in kilometres the epicentre was.

(b) Two friends were talking on the telephone when an earthquake occurred. Sally who lived in Feilding counted 5 seconds between the waves, while Sue who lived in Wanganui counted 7 seconds.

(i) How far away was each person from the epicentre?

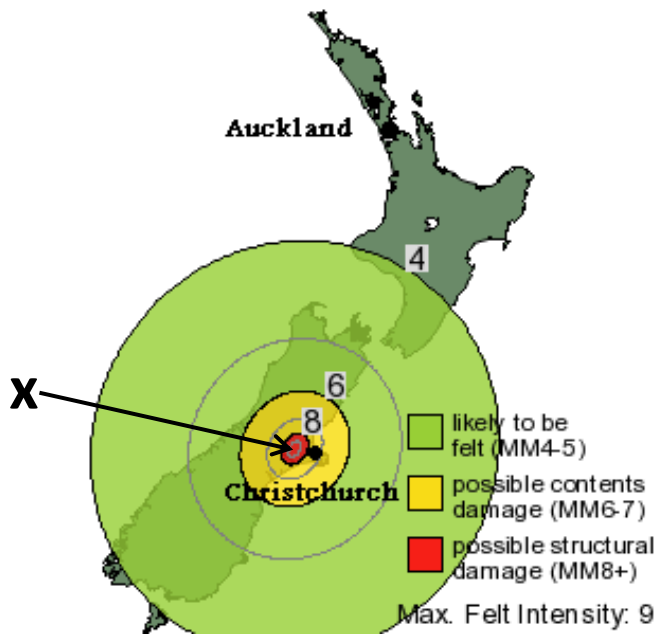
Sally	km
Sue	km

(ii) This map shows the location of the two towns.



What direction did the earthquake come from?

The Christchurch Earthquake



On September 4th 2010 a large earthquake occurred near Darfield (marked by the X on the map), a small community close to Christchurch.

Many scientific terms can be used when writing about earthquakes; some of them are in the word list below.

Word List					
crust	Earth	epicentre	fault line	focus	Mercalli
plate boundary	Richter	s wave	seismograph	seismometer	p wave

(c) Use as many words from the word list as you can to write paragraphs about each of the following features about earthquakes.

Make sure that the words are used correctly so that someone who is studying science can understand what you have written. You may draw diagrams in your answer.

Why do earthquakes occur:

[more space on next page]

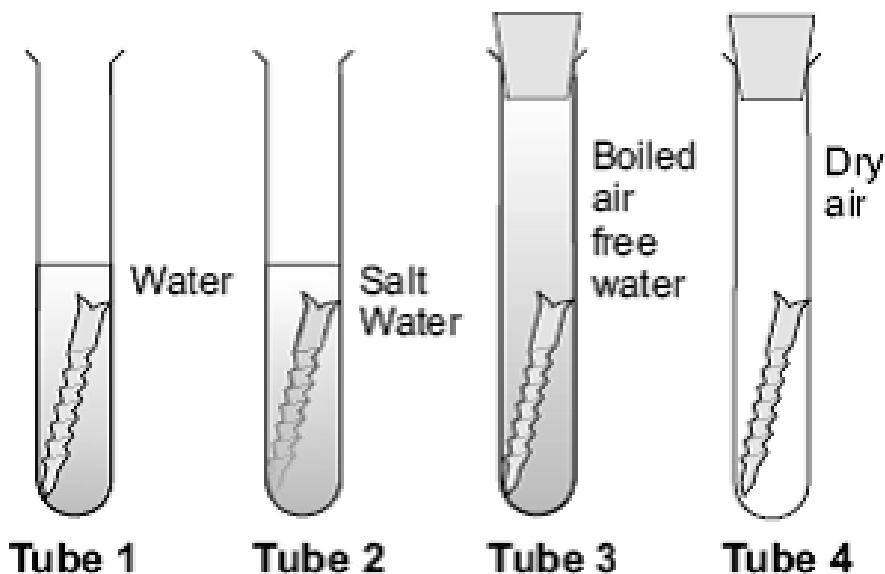
Where earthquakes occur:

The difference between the focus and the epicentre of an earthquake:

What are used to record earthquakes:

Question Six: Rusting Nails [5 marks]

Ewan and Kate investigated the corrosion of iron. They set up the experiment shown below:



The nails were made of a metal called iron. After a week the tubes were examined and rust was seen on the nails in test tubes 1 and 2 but not in tubes 3 and 4.

(a) Why did rust **not** appear in test tube 3?

(b) Why did rust **not** appear in test tube 4?

(c) Describe a difference that would be seen in the appearance of the nails in test tubes 1 and 2 after 1 week. Give a reason for this difference.

Difference:
Reason:

(d) Why must tubes 3 and 4 have tightly fitting stoppers on the tubes?

(e) List 3 variables that must be controlled in this investigation

1.
2.
3.

Question Seven: Gases [4 marks]

A student found the following list of chemicals and apparatus in a laboratory. They wanted to make and collect a sample of gas so that its properties could be investigated. Study the list then answer the questions that follow.

<i>Apparatus list</i>				
magnesium ribbon metal	dilute hydrochloric acid	dilute sodium hydroxide	copper foil metal	manganese dioxide
conical flask	dilute hydrogen peroxide	calcium carbonate (marble) chips	test tubes	test tube stoppers (bungs)
delivery tube	limewater (calcium hydroxide)	wooden splints	Bunsen burner and heatproof mat	water bath (ice cream container + water)

(a) Draw a clear labelled diagram to show how oxygen gas could be **made** and samples **collected** for testing.

